Center for Academic Resources in Engineering (CARE) Peer Exam Review Session

PHYS 212 — University Physics: Electricity and Magnetism

Mid-semester Review Worksheet

The problems in this review are designed to help prepare you for your upcoming exam. Questions pertain to material covered in the course and are intended to reflect the topics likely to appear in the exam. Keep in mind that this worksheet was created by CARE tutors, and while it is thorough, it is not comprehensive. In addition to exam review sessions, CARE also hosts regularly scheduled tutoring hours.

Tutors are available to answer questions, review problems, and help you feel prepared for your exam during these times:

Session 1:

Can't make it to a session? Here's our schedule by course:

https://care.grainger.illinois.edu/tutoring/schedule-by-subject

Solutions will be available on our website after the last review session that we host.

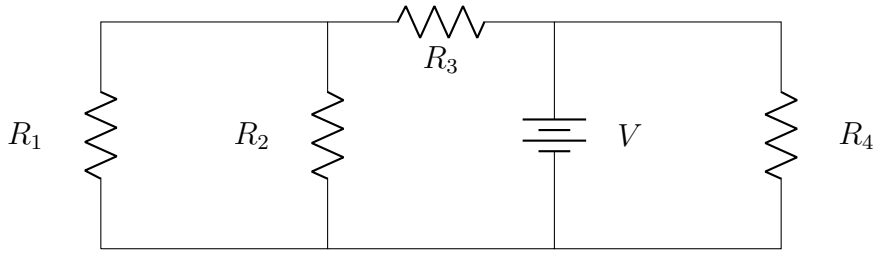
Step-by-step login for exam review session:

1. Log into Queue @ Illinois: https://queue.illinois.edu/q/queue/848
2. Click "New Question"
3. Add your NetID and Name
4. Press "Add to Queue"

Please be sure to follow the above steps to add yourself to the Queue.

Good luck with your exam!

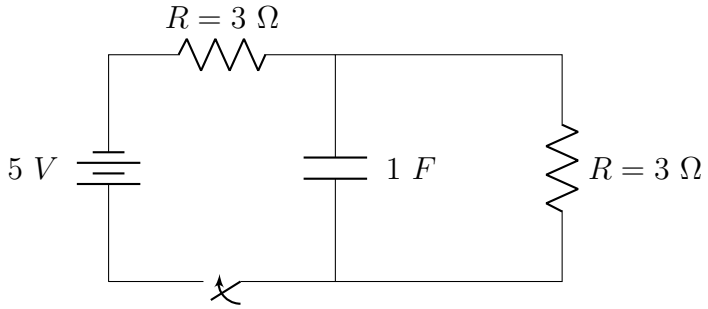
1. A circuit is constructed with four resistors and a battery as shown below. The battery voltage is 18V. $R_1 = 3\Omega$, $R_2 = 6\Omega$, $R_3 = 12\Omega$, $R_4 = 5\Omega$.



(i) What is the voltage across R_2?

(ii) What is the current through R_4?

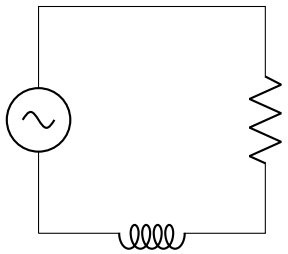
2. A circuit with a 1F capacitor, two 3Ω resistors, and a 5V battery is shown below. The capacitor is initially uncharged and the switch is open.



(i) Immediately after the switch is closed, what is the current across the capacitor?

(ii) What is the charge on the capacitor 2s after the switch is closed?

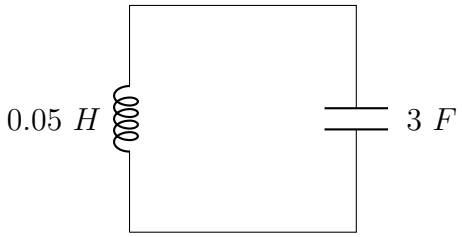
3. An alternating current circuit is constructed with an inductor, a resistor and a generator, but no capacitor.



(i) If we increase the frequency of the generator, what happens to the magnitude of the peak voltage across the resistor?

(ii) What happens to the energy stored in the inductor?

4. A circuit with a 0.05H inductor and a 3F capacitor is shown below. At t = 0, the capacitor is fully charged to 4 C and there are no currents.



(i) Calculate the resonant frequency of this circuit.

(ii) What is the energy stored in the inductor at t = 2 s?